What is claimed is:

1. A method of treating a chamber to remove residue from surfaces in the chamber, the method comprising the steps of:

(a) providing an energized first process gas in the chamber to treat the surfaces in the chamber; and

(b) providing an energized second process gas in the chamber to further treat the surfaces in the chamber, the second process gas being different than the first process gas.

2. A method according to claim 1 wherein the first process gas comprises a fluorinated gas.

3. A method according to claim 2 wherein the fluorinated gas comprises one or more of CF_4, SF_6 and NF_3.

4. A method according to claim 1 wherein the second process gas comprises an oxygen containing gas.

5. A method according to claim 4 wherein the oxygen containing gas consists essentially of oxygen.

6. A method according to claim 1 wherein the treating of the chamber comprises cleaning the chamber.

7. A method of etching a substrate in a chamber and cleaning etchant residue formed on surfaces in the chamber, the method comprising the steps of:

(a) placing the substrate in the chamber;

(b) in a first stage, providing an energized first process gas in the chamber, the first process gas comprising a substrate etching gas and a first cleaning gas; and

(c) in a second stage, providing an energized second process gas in the chamber, the second process gas comprising a second cleaning gas that is different from the first cleaning gas.

8. A method according to claim 7 wherein the first cleaning gas comprises a fluorinated gas.

9. A method according to claim 8 wherein the fluorinated gas comprises one or more of CF_4, SF_6 and NF_3.

10. A method according to claim 7 wherein the second cleaning gas comprises an oxygen containing gas.

11. A method according to claim 10 wherein the oxygen containing gas consists essentially of oxygen.

12. A method according to claim 7 wherein the substrate etching gas comprises a gas capable of etching a metal silicide layer on the substrate.

13. A method according to claim 7 wherein the substrate etching gas comprises one or more of Cl_2, N_2, O_2, HBr and He-O_2.

14. A method according to claim 7 wherein the volumetric flow ratio of substrate etching gas to first cleaning gas is from about 1:1 to about 20:1.

15. A method according to claim 7 wherein the energized second process gas is provided in the chamber while the substrate is in the chamber.

16. A method according to claim 7 wherein in step (a), the substrate is electrostatically held on an electrostatic chuck in the chamber, and in step (c) comprises providing an electronegative plasma of second process gas.

17. A method according to claim 7 wherein in the second stage, the chamber pressure is maintained at from about 1 mTorr to about 10mTorr.

26. A method according to claim 25 wherein the oxygen containing gas consists essentially of oxygen.

27. A method of etching a substrate in a chamber and cleaning etchant residue from surfaces in the chamber, the method comprising the steps of:

(a) electrostatically holding the substrate in the chamber;

(b) providing a first energized gas in the chamber, the first energized gas comprising an etching gas to etch the substrate and a residue cleaning gas; and

(c) providing a second energized gas in the chamber to clean etchant residue deposited on the surfaces in the chamber and simultaneously remove residual charge accumulated in the substrate.

28. A method according to claim 27 wherein the first energized gas comprises a fluorinated gas.

29. A method according to claim 28 wherein the fluorinated gas comprises one or more of CF_4, SF_6 and NF_3.

30. A method according to claim 27 wherein the second energized gas comprises an oxygen containing gas.

31. A method according to claim 30 wherein the oxygen containing gas consists essentially of oxygen.

32. A method according to claim 27 wherein the etching gas comprises a gas capable of etching a metal silicide layer on the substrate.

33. A method according to claim 27 wherein the etching gas comprises one or more of Cl_2, N_2, O_2, HBr and He-O_2.

34. A method according to claim 27 wherein the volumetric flow ratio of etching gas to residue cleaning gas is from about 1:1 to about 20:1.

35. A method of etching a substrate in a chamber and cleaning residue that forms on surfaces in the chamber, the method comprising the steps of:

(a) placing the substrate in the chamber;

(b) in an etching stage, etching one or more materials on the substrate using energized gas, at least one composition of the energized gas including an etching gas comprising one or more of Cl_2, N_2, O_2, HBr and He-O_2; and a residue cleaning gas comprising one or more of CF_4, SF_6 and NF_3; and

(c) cleaning the residue formed on the surfaces in the chamber using another energized gas comprising oxygen.

36. A method according to claim 35 wherein the volumetric flow ratio of etching gas to residue cleaning gas is from about 1:1 to about 20:1.

37. A method according to claim 35 wherein the energized gas comprising oxygen is provided in the chamber while the substrate is in the chamber.

38. A method according to claim 35 wherein in step (a), the substrate is electrostatically held on an electrostatic chuck in the chamber, and in step (c), the energized gas comprising oxygen comprises a plasma that assists in dechucking the substrate from the electrostatic chuck.

39. A method of etching a substrate in a chamber and cleaning residue formed on surfaces in the chamber, the chamber comprising an electrostatic chuck, and the method comprising the steps of:

(a) transferring a substrate into the chamber and electrostatically holding the substrate on the electrostatic chuck, the substrate comprising a mask layer;

(b) providing an energized gas in the chamber to etch the mask layer on the substrate thereby forming residue on the surfaces in the chamber, the residue comprising chemical species originating from the mask layer;

(c) providing another energized gas in the chamber to etch material below the mask layer, the energized gas comprising etching gas and residue cleaning gas, the etching gas comprising one or more of Cl_2, N_2, O_2, HBr, and He-O_2 and the residue cleaning gas comprising one or more of CF_4, SF_6, and NF_3; and

(d) providing an oxygen containing plasma in the chamber to assist in dechucking the substrate and to clean the residue formed on the surfaces in the chamber.

40. A method according to claim 39 wherein the volumetric flow ratio of etching gas to residue cleaning gas is from about 1:1 to about 20:1.

41. A method of cleaning a chamber to remove residue from surfaces in the chamber, the method comprising the steps of:

(a) providing an energized first process gas in the chamber to clean the surfaces in the chamber; and

(b) adjusting the chamber source power to control the amount of residue removed from the surfaces.

42. A method according to claim 41 wherein step (b) comprises increasing the chamber source power to increase the amount of residue removed from the surfaces.

43. A method according to claim 41 further including the step of maintaining the chamber bias power at substantially zero Watts.

44. A method according to claim 41 wherein the first process gas comprises an oxygen containing gas.

45. A method according to claim 43 wherein the oxygen containing gas consists essentially of oxygen.

18. A method according to claim 7 wherein in the second stage, the ratio of source power to bias power is from about 5:3 to about 40:1.

19. A method of etching a substrate in a chamber and cleaning etchant residue from surfaces in the chamber, the method comprising the steps of:

(a) placing the substrate in the chamber;

(b) etching a first material on the substrate thereby depositing a first etchant residue on the surfaces in the chamber;

(c) etching a second material on the substrate while suppressing deposition of a second etchant residue onto the first etchant residue, the first etchant residue being compositionally different from the second etchant residue; and

(d) cleaning the first and second etchant residue deposits formed on the surfaces in the chamber.

20. A method according to claim 19 wherein etching the first material comprises the step of providing an energized first gas in the chamber.

21. A method according to claim 20 wherein etching the second material comprises the step of providing an energized second gas in the chamber.

22. A method according to claim 21 wherein the first gas comprises a first cleaning gas and the second gas comprises a second cleaning gas.

23. A method according to claim 22 wherein the first cleaning gas comprises a fluorinated gas.

24. A method according to claim 23 wherein the fluorinated gas comprises one or more of CF_4, SF_6 and NF_3.

25. A method according to claim 22 wherein the second cleaning gas comprises an oxygen containing gas.